# Witco

100293

Witco Corporation, P.O. Box 8587, Woodcliff Lake, New Jersey 07675 Telephone 201-573-2800

18 March 1993

Mr. Eric Newman (3HW42)
EPA Remedial Project Manager
United States Environmental Protection Agency
Region III
841 Chestnut Street
Philadelphia, PA 19107

Re: Treatability Study - Revised Schedule
Halby Chemical Site OU 1
Wilmington, New Castle County
Delaware

Dear Mr. Newman:

In accordance with Section XIB of the Consent Decree between Witco Corporation and the United States for Operable Unit 1 at the Halby Chemical Site, Wilmington, New Castle County, Delaware, Witco hereby submits a revised schedule and a list of planned activities for the Treatability Study of the soils at the Halby Chemical Site OU 1.

- 25 March 1993

**Treatability Study Soil Sampling**

- Langan Engineering and Environmental Services, Inc. (Langan) will arrive on-site at 09:00 to prepare for sampling activities.
- Level C PPE (tyvek overalls, boot covers, gloves, and respirators) will be worn as a result of health and safety monitoring performed during grid sampling activities.
- Langan will begin sampling activities at 10:00.
- Soil samples from locations S-9 and S-22, a clean sand sample, an equipment blank, and an equipment rinsate blank will be collected and analyzed for CaPAHs, arsenic, total chromium, and hexavalent chromium. Soil samples will also be analyzed for percent moisture. TCLP leachate will be prepared from the S-9 sample, S-22 sample, and clean sand sample and analyzed for CaPAHs, arsenic, total chromium, and hexavalent chromium.
- Soil samples collected from locations S-9 and S-22 will also be placed in separate jars for the treatability study.
- Clean sand sample will be used as treatability study control.
- No split samples with EPA are anticipated for unstabilized soil as per $CH_2M$ Hill.
- All analysis on unstabilized soils and blanks will be performed by Nytest Environmental, Inc. (NEI) of Port Washington, New York using CLP 3/90 SOW protocol for all analysis with the exception of percent moisture, hexavalent chromium and TCLP which will conform to SW846 methodology.
- NEI courier will pick up all samples at the asphalt laboratory.
- All analysis will be performed on a 28-day turnaround.

**Stabilized Monolith Preparation**

- Stabilized soil monoliths will be prepared at the asphalt laboratory of Earthworks, New Castle, Delaware immediately after collection of soil samples (see enclosure).
- Ten asphalt stabilized monoliths will be prepared.
- A total of eight monoliths will be prepared from S-9 and S-22 soil samples at four concentrations of asphalt (5, 10, 25 and 50%).
- One monolith will be prepared from the sand sample at a concentration of 10% asphalt.
- One monolith will be prepared from the S-9 soil sample at 5% asphalt and spiked with 150 µl of Carbon Disulfide ($CS_2$). This amount of $CS_2$ represents more than twice the maximum concentration of $CS_2$ identified in soil samples taken during the RI/FS for OU-1.
- All equipment used in the monolith preparation will be either disposable or decontaminated both before and after use, using the same procedure that is applied to field sampling equipment.
- All residual asphalt will be removed from the testing equipment using 1,1,1-Trichloroethane prior to decontamination as per the asphalt laboratory SOP. (The 1,1,1-Trichloroethane is substituted for the kerosene specified in the Remedial Design Work Plan.) The 1,1,1-Trichloroethane is recycled at the asphalt laboratory.
- Any decontamination fluids generated will be disposed of after RCRA/TCLP disposal analysis.
- All soil samples will be oven dried for approximately two hours until a constant weight is reached.
- Soil samples will then be divided into ten separate pans as follows: five S-9 samples, four S-22 samples, and one clean sand sample.
- $CS_2$ will be added to the appropriate soil sample after drying to constant weight but before being brought to 325°F.
- All soil samples will be heated overnight to 325°F.

26 March 1993

**Stabilized Monolith Preparation (continued)**

- Monoliths will be prepared individually by adding the proportional amount of 290°F asphalt required to each aliquot of soil, which has been heated to 325°F. Monolith preparation is expected to be approximately 3 hours. (The standard practice of this asphalt plant is to heat the asphalt to 290°F.)
- The interior surfaces of the molds will be treated with a non-stick, release agent prior to introduction of the stabilized soil.
- After mixing, the soil/asphalt will be poured into 3"x6", steel, cylindrical molds.
- The molds will be allowed to cool to handling temperature (approximately 2 hours) prior to transport.

**Monolith Transport and Storage**

- Exposed surfaces of the monoliths in the molds will be covered with aluminum foil for contamination protection. The monoliths will remain in the molds for a minimum of 24 hours.

- All monoliths will be transported to Langan's geotechnical testing laboratory for storage during the 10-day curing period.
- Once cool to ambient temperature, the molds will be sealed in plastic bags for moisture protection.
- All possible air will be removed from the plastic bags prior to being sealed.
- Sample holding time of 14 days prior to TCLP extraction will begin at the conclusion of the 10 day curing period, which is on 4 April 1993.

■ 7 April 1993

**Geotechnical Testing**

- Beginning at 09:00 Langan personnel will conduct Unconfined Compressive Strength Testing on each of the 10 monoliths.
- All items which the monoliths will come into contact with will either be disposable or previously decontaminated by an outside laboratory using the decontamination procedure previously applied to the field equipment.
- After geotechnical testing has been completed, the S-9/10% asphalt monolith will be split with EPA personnel as specified by $CH_2M$ Hill. It is anticipated that approximately 600g of stabilized soil sample will be available to EPA for their testing purposes. Because the stabilized sample will not compact as easily, oversized jars are recommended for collection purposes.
- All remaining monolith sections will be packaged in environmental sample containers for transport to NEI for chemical testing.
- NEI will crush all monoliths to conform to TCLP protocol.
- Each leachate sample will be analyzed similarly to the leachates produced from the unstabilized soils.
- The sand/10% asphalt monolith will be used by NEI as the laboratory QA/QC sample for matrix spike and matrix spike duplicate analysis.
- Chemical analysis on monoliths will also be performed on a 28-day turnaround.

■ 8 April 1993

**Sample Pick-Up**

- NEI courier will pick-up monolith samples from Langan's geotechnical laboratory and transport samples to NEI for TCLP testing.

■ 22 April 1993

- Delivery of unstabilized soil, blank and disposal analysis reports from NEI is anticipated.

- 6 May 1993

  - Delivery of monolith TCLP analysis reports from NEI is anticipated.

All chemical testing and analysis not specifically outlined will be conducted in a similar fashion as was done during the soil grid sample analysis.

The dates given in this outline supersede any previously transmitted. Schedule variation has been required due to delays in delivery of laboratory analytical data reports (see 24 February 1993 letter) and later than anticipated asphalt plant opening following the normal winter shut down.

Enclosed please find directions to the Edgemore Materials asphalt plant and an updated analytical results table from the Soil Grid Sampling. Also enclosed is an updated Chain of Custody Form which Langan would like to use in place of the Sample Analysis Request Form and previously submitted Chain of Custody Form.

If you have any questions or comments, please do not hesitate to contact me.

Very truly yours,

WITCO CORPORATION

R. D. Vyas
Project Coordinator

RDV:mg
Enclosure
20616\TrstStdy.ltr

cc: E. Papazian, Esq.
Manjiang Zhang - Delaware DNREC

## DIRECTIONS TO ASPHALT PLANT

**Plant Address:**

Edgemore Materials
1285 Hay Road
Wilmington, DE 19809
(302) 655-1510

**Contact Person:**

Mr. David W. West
Earthworks Environmental Services, Inc.
200 Marsh Lane
New Castle, DE 19720
(302) 427-8556

From the Halby Chemical Site:

- Terminal Avenue to I-495
- I-495 North one exit to Exit 3 (12th Street)
- Left (west) on 12th Street over R/R tracks
- First right onto Hay Road
- Past portable cement plant on right (green)
- Asphalt plant is on right (yellow) with trailer offices/lab along Hay Road

DRAFT

# TABLE 1
## SUMMARY OF SAMPLE ANALYTICAL RESULTS
## (HALBY CHEMICAL SITE - WILMINGTON, DE)

| Sample Location | REMEDIATION | | S-1 | S-2 | S-3 | S-4 | S-5 | DUP-1 (S5) | S-6 | S-7 | S-8 | S-9 | S-10 | S-11 | S-12 | S-13 | S-14 | S-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth (in) | GOAL AND | | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 |
| Sample Number | PERFORMANCE | | 001 | 002 | 003 | 004 | 005 | 028 | 006 | 007 | 008 | 009 | 010 | 011 | 012 | 013 | 014 | 015 |
| Sample Date | STANDARD | | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 |
| ***Parameters*** | | ***Units*** | | | | | | | | | | | | | | | | |
| **CaPAHs** | | | | | | | | | | | | | | | | | | |
| Di-n-butyl phthalate | --- | ppm | 0.051 J | 0.11 J | 0.096 J | 0.038 J | 0.053 J | 0.25 J | 0.11 J | 0.025 J | 0.057 J | 0.069 J | 0.074 J | 0.038 J | 0.17 J | 0.097 J | 0.079 J | 0.031 J |
| Butyl benzyl phthalate | --- | ppm | 0.053 J | 0.049 J | 0.017 J | 0.011 J | 0.11 J | 0.24 J | 0.026 J | 0.046 J | 0.013 J | ND | ND | 0.24 J | 0.16 J | 0.061 J | 0.29 J | 0.024 J |
| Benzo (a) anthracene | --- | ppm | ND | 0.20 J | 0.028 J | 0.020 J | 1.5 J | 2.6 | 0.030 J | 0.11 J | 0.045 J | ND | 0.041 J | 0.24 J | 1.0 J | 13 | 0.063 J | 0.14 J |
| Chrysene | --- | ppm | ND | 0.24 J | 0.10 J | 0.065 J | 4.5 | 4.7 | 0.10 J | 0.27 J | 0.14 J | 0.14 J | 0.17 J | 0.47 J | 1.5 | 18 | 0.15 J | 0.22 J |
| Bis (2-ethylhexyl) phthalate | --- | ppm | 0.18 J | 0.53 J | 0.14 J | 1.9 | 0.69 J | 2.6 | 0.97 J | 0.51 J | 1.1 | 0.20 J | 0.20 J | 0.22 J | 8.7 | 0.36 J | 0.94 | 0.10 JB |
| Benzo (b) fluoranthene | --- | ppm | 0.092 J | 0.23 J | 0.056 J | 0.055 J | 4.9 | 7.8 | 0.078 J | 0.23 J | 0.12 J | 0.092 J | 0.088 J | 0.36 J | 1.4 J | 10 | 0.074 J | 0.22 J |
| Benzo (k) fluoranthene | --- | ppm | 0.073 J | 0.14 J | 0.077 J | 0.042 J | 5.3 | 5.5 | 0.071 J | 0.20 J | 0.17 J | 0.063 J | 0.066 J | 0.27 J | 1.4 J | 11 | 0.057 J | 0.15 J |
| Benzo (a) pyrene | --- | ppm | ND | 0.24 J | 0.048 J | 0.029 J | 4.4 | 4.8 | 0.11 J | 0.16 J | 0.064 J | ND | 0.12 J | ND | 1.2 J | 10 | 0.38 J | ND |
| Indeno (1,2,3-c,d) pyrene | --- | ppm | ND | 0.17 J | 0.068 J | 0.031 J | 4.0 | 4.1 | 0.0090 J | 0.077 J | 0.066 J | ND | ND | ND | 1.1 J | 5.8 | ND | ND |
| *TOTAL CaPAHs* | *1.2* | *ppm* | *0.449* | *1.91* | *0.630* | *2.19* | *25.4* | *32.6* | *1.50* | *1.63* | *1.78* | *0.604* | *0.759* | *1.84* | *16.6* | *68.3* | *2.03* | *0.785* |
| **METALS** | | | | | | | | | | | | | | | | | | |
| Arsenic | 10 | ppm | 85.7 N* | 29.8 N* | 69.3 NW* | 69.2 NW* | 26.5 NW* | 52.8 NW* | 131 NW* | 115 NW* | 429 N* | 809 N* | 44.3 N* | 91.8 N* | 186 NW* | 309 N* | 48.5 NW* | 143 N* |
| Chromium (total) | --- | ppm | 109 N* | 243 N* | 107 N* | 103 N* | 162 N* | 183 * | 205 N* | 284 N* | 37.5 N* | 41.9 N* | 61.5 N* | 277 N* | 1,220 N* | 1,100 N* | 113 N* | 80.3 N* |
| Chromium (VI) | --- | ppm | 0.30 | 1.02 | 7.69 | 4.80 | 0.13 | 0.54 N | 0.70 | ND | ND | 2.00 | 0.01 | 0.92 | 1.47 | 0.27 | 2.73 | 0.07 |
| Chromium (III)** | --- | ppm | 109 | 242 | 99.3 | 98.2 | 162 | 182 | 204 | 284 | 37.5 | 39.9 | 61.5 | 276 | 1,220 | 1,100 | 110 | 80.2 |
| Aluminum ^ | --- | ppm | 12,500 * | 7,260 * | 10,300 * | 6,200 * | 4,450 * | 3,360 * | 4,250 * | 1,890 * | 9,530 * | 10,600 * | 8,980 * | 4,850 * | 5,140 * | 8,270 * | 11,500 * | 3,420 * |
| Iron ~^ | --- | ppm | 29,400 * | 39,800 * | 65,600 * | 50,300 * | 271,000 * | 211,000 * | 273,000 * | 224,000 * | 132,000 * | 53,400 * | 72,500 * | 81,800 * | 147,000 * | 90,700 * | 50,400 * | 30,000 * |
| Manganese ~ | --- | ppm | 666 * | 2,050 * | 526 * | 259 * | 1,750 * | 1,350 * | 1,550 * | 1,300 * | 178 * | 185 * | 363 * | 2,520 * | 4,200 * | 9,050 * | 394 * | 485 * |
| Vanadium ~ | --- | ppm | 81.4 N* | 65.1 N* | 85.1 N* | 46.3 N* | 92.9 N* | 72.6 N* | 74.4 N* | 38.5 N* | 48.4 N* | 52.0 N* | 30.9 N* | 71.6 N* | 113 N* | 131 N* | 75.1 N* | 39.6 N* |

*ND= Not Detected  B= Found in method blank. Indicates laboratory contamination.  J= An estimated value, found below the detection limit.  E= An estimated value, found above the upper calibration limit.*

*N= MS recovery outside control limits.  W= Post digestion spike for furnace AA outside control limits.  * Duplicate analysis outside control limits.*

*** Chromium (III) calculated as (total - VI = III). [Note: all qualifiers for Cr +6 and total Cr apply to Cr +3.]  ^ Interfering element for arsenic analysis.  ~ Interfering element for chromium analysis.*

DRAFT

## TABLE 1 (continued)
## SUMMARY OF SAMPLE ANALYTICAL RESULTS
## (HALBY CHEMICAL SITE - WILMINGTON, DE)

| Sample Location | REMEDIATION | | DUP-2 (S15) | S-16 | S-17 | S-18 | S-19 | S-20 | S-21 | S-22 | S-23 | S-24 | S-25 | DUP-3 (S25) | S-26 | S-27 | S-31 | S-32 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth (ln) | GOAL AND | | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | 0-3 | FB | ERB |
| Sample Number | PERFORMANCE | | 029 | 016 | 017 | 018 | 019 | 020 | 021 | 022 | 023 | 024 | 025 | 030 | 026 | 027 | 031 | 032 |
| Sample Date | STANDARD | | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 | 1/21/93 |
| ***Parameters*** | | ***Units*** | | | | | | | | | | | | | | | | |
| **CaPAHs** | | | | | | | | | | | | | | | | | | |
| Di-n-butyl phthalate | --- | ppm | 0.010 JB | 0.029 J | 0.077 J | 0.049 JB | 0.57 J | 1.1 | 0.93 | 0.13 J | 0.040 JB | 0.029 JB | 0.022 JB | 0.012 JB | 0.062 J | 0.040 J | ND | ND |
| Butyl benzyl phthalate | --- | ppm | ND | 0.026 J | 0.23 J | 0.025 JB | 1.2 | 0.62 J | 0.61 J | ND | 0.076 J | ND | 0.050 JB | 0.035 JB | 0.54 J | ND | ND | ND |
| Benzo (a) anthracene | --- | ppm | 0.16 J | 2.1 | 0.073 J | 0.21 J | 0.088 J | 0.16 J | 1.2 | 57 | 2.8 | 0.65 | 0.47 | 0.30 J | 0.85 J | ND | ND | ND |
| Chrysene | --- | ppm | 0.22 J | 2.8 | 0.15 J | 0.30 J | 0.14 J | 0.27 J | 1.5 | 84 | 3.3 E | 0.77 | 0.55 | 0.51 | 1.0 | ND | ND | ND |
| Bis (2-ethylhexyl) phthalate | --- | ppm | 0.23 J | 0.017 JB | 0.18 J | 0.0070 JB | 1.9 | 0.24 JB | 1.6 | 5.3 J | 0.19 JB | 0.060 JB | 0.087 JB | 0.058 JB | 0.60 J | 0.50 JB | ND | ND |
| Benzo (b) fluoranthene | --- | ppm | 0.16 J | 2.0 | 0.12 J | 0.19 J | 0.082 J | 0.29 J | 1.2 | 51 | 2.6 | 0.59 | 0.47 | 0.35 J | 0.88 J | ND | ND | ND |
| Benzo (k) fluoranthene | --- | ppm | 0.14 J | 2.0 | 0.058 J | 0.16 J | 0.079 J | 0.16 J | 0.87 | 59 | 2.4 | 0.44 | 0.29 J | 0.38 | 0.69 J | ND | ND | ND |
| Benzo (a) pyrene | --- | ppm | ND | 1.8 | ND | 0.20 J | ND | 0.19 J | 0.72 | 55 | 2.2 | 0.48 | 0.30 J | 0.35 J | 0.58 J | ND | ND | ND |
| Indeno (1,2,3-c,d) pyrene | --- | ppm | ND | 1.3 | ND | ND | ND | ND | 0.56 J | 39 | 1.7 | 0.34 J | ND | 0.22 J | ND | ND | ND | ND |
| *TOTAL CaPAHs* | *1.2* | *ppm* | *0.910* | *12.1* | *0.888* | *1.14* | *4.06* | *2.79* | *9.19* | *350* | *15.1* | *3.27* | *2.08* | *2.11* | *5.20* | *0.040* | *ND* | *ND* |
| **METALS** | | | | | | | | | | | | | | | | | | |
| Arsenic | 10 | ppm | 156 N* | 31.0 NW* | 47.1 NW* | 38.3 N* | 92.0 N* | 15.8 NW* | 678 N | 63.1 NW* | 15.1 NW* | 5.8 N* | 25.4 NW* | 28.5 NW* | 70.8 NW* | 38.0 NW* | ND | ND |
| Chromium (total) | --- | ppm | 77.2 * | 2,620 N* | 2,230 N* | 147 N* | 374 N* | 37.3 N* | 492 * | 676 * | 151 * | 275 * | 2,090 * | 2,300 * | 19,400 * | 148 * | ND | ND |
| Chromium (VI) | --- | ppm | 0.73 N | 0.93 | 0.50 | 0.13 | 0.66 | 0.12 | 0.10 N | 0.77 N | 0.32 N | 0.94 N | 0.61 N | 0.96 N | 6.39 N | 0.06 N | ND | ND |
| Chromium (III)** | --- | ppm | 76.5 | 2,620 | 2,230 | 147 | 373 | 37.2 | 492 | 675 | 151 | 274 | 2,090 | 2,300 | 19,400 | 148 | ND | ND |
| Aluminum ^ | --- | ppm | 3,310 * | 9,850 * | 14,900 * | 2,610 * | 6,420 * | 2,400 * | 5,980 * | 4,630 * | 5,670 * | 8,380 * | 10,100 * | 12,100 * | 6,250 * | 7,450 * | ND | ND |
| Iron ~^ | --- | ppm | 35,200 * | 104,000 * | 85,600 * | 172,000 * | 80,800 * | 7,040 * | 59,400 * | 37,700 * | 23,700 * | 27,400 * | 65,500 * | 75,100 * | 130,000 * | 96,300 * | ND | ND |
| Manganese ~ | --- | ppm | 451 * | 22,900 * | 18,800 * | 1,470 * | 2,340 * | 355 * | 7,190 * | 4,870 * | 1,140 * | 2,250 * | 15,000 * | 21,200 * | 2,340 * | 487 * | ND | ND |
| Vanadium ~ | --- | ppm | 37.5 N* | 232 N* | 238 N* | 117 N* | 83.9 N* | 19.4 N* | 97.7 N* | 108 N* | 29.5 N* | 43.4 N* | 259 N* | 319 N* | ND-N* | 37.3 N* | ND | ND |

*ND= Not Detected  B= Found in method blank. Indicates laboratory contamination.  J= An estimated value, found below the detection limit.  E= An estimated value, found above the upper calibration limit.*

*N= MS recovery outside control limits.  W= Post digestion spike for furnace AA outside control limits.  * Duplicate analysis outside control limits.*

*** Chromium (III) calculated as (total - VI = III). [Note: all qualifiers for Cr +6 and total Cr apply to Cr +3.]  ^ Interfering element for arsenic analysis.  ~ Interfering element for chromium analysis.*

# CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Langan
Engineering and Environmental Services

PAGE ____ OF ____

Proj. Name: Proj. No:
Auth. By:
Site Location: Phone No:
Sampled By:
Company:

ANALYSIS REQUESTED

| Sample Number | Location | Depth | Date | Time | Matrix | Grab Comp. | Inorg/PHC Preserve. | No. of Cont. | | | | | | | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

Metals Filtered (Yes/No)? _____ Total No. of Containers: _____
Aq. VOAs Pres. (Yes/No)? _____
Rush T/A, Report format, Contingent analysis: _____

| | Relinquished By: | DATE: | Received By: |
|---|---|---|---|
| (1) | Company: | TIME: | Company: |
| (2) | Company: | TIME: | Company: |
| (3) | Company: | TIME: | Company |
| (4) | Company: | TIME: | Company |

Laboratory Name & Address:

AR300831

ORIGINAL (red)